

THURSDAY, JULY 5, 1888.

THE DECADENCE OF THE CHEMICAL PROFESSION IN GOVERNMENT OPINION.

THE Professorship of Chemistry in the Royal Naval College, Greenwich, is, or is about to become, vacant through the resignation of Dr. H. Debus, F.R.S., and it is currently reported that the authorities have been advised to discontinue the professorship, and to substitute for it a mere lectureship or readership. We trust that this rumour may prove unfounded, or that the Government may be led in time to see the folly of degrading a subject which, if properly handled, is of such extreme value and importance to the Navy. We say degrade, because in the first place it cannot be questioned that chemistry is a science which may claim to rank with any other which enters into the curriculum at Greenwich, both on account of its educational value and its direct usefulness; and because any such change must of necessity tend to lower the value of chemical knowledge in comparison with that of other subjects in the eyes of the students.

It is scarcely necessary to point out in how many ways a knowledge of chemistry may be of service in the Navy. Our sailors are stationed in all parts of the world, and the question of water-supply both for men and boilers is an ever-present one: a decision as to the quality of a water can only be given after it has been examined chemically. Again, the action of sea-water on metals, the corrosion of metals, the decay of timber, the economical use of fuel, are all matters in which the sailor nowadays is deeply interested, and these can only be rightly understood by those who have acquired a sound knowledge of chemical principles. There are very many other ways in which chemistry is of direct value to the sailor; but, most important of all, there is no subject which, if properly and practically taught, affords the same opportunity of training the student to observe accurately and to think correctly, and it is especially on this ground that chemistry should be assigned a high position in the course at a Naval College. It will, however, not suffice to require attendance at a course of lectures in which general chemistry is treated of in slow and measured cadences and no heed is paid to the requirements of the students: the subject must be taught technically, and almost exclusively with direct reference to matters familiar to sailors and to their future requirements; and the training must be to a very large extent carried on in the laboratory, and not in the lecture-room.

If the results thus far obtained at Greenwich have not been such as to lead the authorities to appreciate the value of the subject, the most short-sighted course they can possibly pursue in the hope of obtaining better results in the future will be to assign a lower rank to chemistry. In cases of grave disease, if a practitioner, guided by particular traditions, and operating under conditions which he takes no particular pains to control, be unsuccessful, it is not usual to call in another of lower grade; but on the contrary, if possible, one of equal or higher grade is summoned, holding different and perhaps wider

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views, and the effort is made to improve the conditions so as to give every opportunity for his treatment to be successful: and so may it happen, we trust, at Greenwich.

In these anxious times of fierce competition the nation cannot afford that the Government should act so as in the least degree to diminish the importance of so valuable a branch of science as chemistry. Moreover, a golden opportunity will be lost if occasion be not now taken to appoint at Greenwich a chemist who not only is known to have been thoroughly trained, but who has given proof, by his own researches and those of his pupils, that he is possessed of enthusiasm, and capable of extending our knowledge. In connection with explosives, and in many other directions, there is infinite opportunity for research; and it is a disgrace to the nation that the Navy at present has not a single chemist of repute in its service, especially as such invaluable service has been rendered to the War Department by its chemist, Sir Frederick Abel.

If the professorship at Greenwich be quashed, it is unlikely that a man of proper calibre will be attracted by a mere lectureship; and thus another step will have been taken to indicate that in this country we care little for science, that our Government is blind to facts so clearly recognized by foreign Powers. Among the noted men of science now in the House of Commons, besides Prof. Stokes, there are three chemists, Prof. Maskelyne, Sir Lyon Playfair, and Sir Henry Roscoe: we feel sure that they will not allow the Government to make a false move in so important a matter without publicly warning them, and without fully eliciting their reasons.

THE LAND AND FRESH-WATER MOLLUSCA OF INDIA.

Land and Fresh-water Mollusca of India. Edited by Lieut.-Colonel H. H. Godwin-Austen, F.R.S., &c. Parts I. to VI. (London: Taylor and Francis, 1882-88.)

ALTHOUGH much has been done to elucidate the fauna of our great Eastern dependency, very much more still remains to be accomplished: vast tracts have yet to be explored scientifically, even though, year by year, new areas are visited by the naturalist and collector, and fresh species are added to the list.

This is especially evident in the case of land and fresh-water Mollusca; whilst so scattered are the various descriptions of the species up and down the pages of different scientific journals and magazines, that the specialist himself has a hard task to ascertain whether a given example is new or not.

It is true that Hanley and Theobald,¹ in their now classical work, went some way towards remedying this state of things; but their task was never completed, and many new forms have been discovered since their publication was brought to a close.

Under these circumstances the present undertaking cannot fail to be most welcome. It is modestly described as "supplementary" to the work just named; but, in reality, it is something far more important, if we may

¹ The names are inadvertently reversed on the title-page of Colonel Godwin-Austen's book.

judge from the six parts (257 pp.), which, with their sixty-two hand-coloured plates, will, when the index is issued, complete the first volume. Each species figured is most thoroughly described, and, when not new, full quotations with the synonymy are given. The figures are also the handiwork of Colonel Godwin-Austen, and though they by no means attain to that standard of excellence with which Sowerby at his best made us familiar, they are effective and (fortunately) under, rather than over, coloured. The illustrations of the living animals, which are copied from drawings by a native artist, are extremely spirited and life-like. Anatomical details where obtainable are given, and, what is yet more important from the systematic point of view, the Radulæ are figured; for, whatever may be the case with marine forms, in the Pulmonates certainly it is of the greatest importance.

How truly gigantic the task Colonel Godwin-Austen has set himself, becomes apparent when it is seen that, disregarding political boundaries, under "India" are included "South Arabia, Baluchistan, Afghanistan, Kashmir, Nepal, Burmah, Pegu, Tenasserim, Malay Peninsula, Ceylon, and other islands of the Indian Ocean"; whilst, when necessary for purposes of comparison, genera from yet other countries are also described and figured (*e.g.* *Geomalacus*, *Africarion*)—of a truth there does not seem to be any probability that the author will ever, like some scientific Alexander, be in want of fresh fields for conquest!

The weak point of the work appears to be that "the genera and sub-genera are treated of in no particular order, . . . but as data concerning them can be put together and the drawings completed." Nothing, we feel sure, but the necessity of doing so, if the work was to be published at all, can have induced the author to adopt such a course. Few things are more provoking to the student than the necessity of turning to many different pages in the same work when engaged on a particular subject, an inconvenience which even a good index does not obviate; whilst in its absence matters are not improved by such a table as the one given on p. 253, which professes to be "a classification of families and genera treated of in the preceding pages," but which only includes those placed by the author in Fam. Zonitidæ (or, as it is misprinted, Zonatiidæ).

This infringement of Nature's first law renders it hard to disabuse one's mind of the unfortunate impression derived on a first examination that the author had transcribed and enlarged his preliminary notes without previously sorting them. Nor does the reason alleged seem altogether sufficient: "the classification can be hereafter attempted; we shall then be better able to judge what weight, generic or sub-generic, to give to the many genera now recorded from the Indian region." This did not preclude the author from giving—as we trust he will do in a future part—what all who try to follow him would find of great assistance; namely, a provisional table of classification in which the main divisions at all events should be shown.

Such a scheme would be none the less useful seeing that he evidently, like most authorities, has his own notions on the subject, which at present can only dimly be guessed at by a careful perusal of the text. Thus at

p. 165 he speaks of "the two great natural divisions of land Mollusca, . . . the Helicidæ and Cyclophoridæ." Again, he agrees with Fischer (v. p. 59) that *Hyalimax* belongs to the same group as *Succinea*; but on pp. 64–65 gives a "key to genera of Limacidæ and Arionidæ" in which *Hyalimax* figures.

Another drawback, if it may be so described, is the undue prominence given to minor differences, and the consequent elevation into genera of what in the eyes of the general conchologist are sub-genera, or even mere sections of sub-genera. This, however, raises a very wide and much vexed question, into which far be it from us to enter.

In thus briefly indicating what appear to us the shortcomings of this important work, we are by no means blind to its great value, and we most heartily wish success to its author in his arduous undertaking, which bids fair to prove as endless as that of Sisyphus.

RECENT MATHEMATICAL BOOKS.

A Chapter in the Integral Calculus. By A. G. Greenhill, M.A. (London: Hodgson, 1888.)

A Treatise on Plane Trigonometry: containing an Account of Hyperbolic Functions, with Numerous Examples. By John Casey, F.R.S. (Dublin: Hodges, 1888.)

A Higher Arithmetic and Elementary Mensuration. By P. Goyen, Inspector of Schools, New Zealand. (London: Macmillan, 1888.)

The Harpur Euclid. Book II. By E. M. Langley, M.A., and W. S. Phillips, M.A. (London: Rivingtons, 1888.)

THE first book in this list is intended to be used by way of supplement to any ordinary treatise on the calculus. It might almost be said that Prof. Greenhill is nothing if not *hyperbolic*, for he expatiates in seas of these functions and the kindred Weierstrassians. No one has done better work than he in his endeavours to make them "familiar as household words" to students, to whom, as Dr. Casey remarks in the preface to his "Trigonometry," they are very interesting and important, not only in pure mathematics but also in mathematical physics. Our author, who is quite in accord with this opinion, considers that "the hyperbolic functions have not received adequate treatment in ordinary text-books; to illustrate this importance, a digression has been made on their principal properties, illustrated by examples of their application."

In the course of thirty-six pages he gives an exceedingly clear sketch, and works out in detail several examples, viz. the different forms of the result of $\int dx/(x-p)\sqrt{R}$, where $R \equiv ax^2 + 2bx + c$, and several kindred forms. The analogies and properties of the hyperbolic functions are considered; three sections are given up to hyperbolic trigonometry; three more to relations connecting true, excentric, and mean anomaly in an elliptic and hyperbolic orbit; and a section to Abel's theorem and the general integral $\int \frac{N}{D} \cdot \frac{dx}{\sqrt{R}}$, and to the rectification of some curves.